

HASEGAWA et al. -- 10/696,702  
Attorney Docket: 061063-0306592

### REMARKS

Claims 7, 9, 10, and 16-20 are pending. By this Amendment claim 8 is canceled without prejudice or disclaimer; claims 7, 9 and 10 are amended; and claims 16-20 are added. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Claim 7 was rejected under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph. The rejection is respectfully traversed.

MPEP § 2172.01 states: "A claim which omits matter disclosed to be essential to the invention as described in the specification or in other statements of record may be rejected under 35 U.S.C. 112, first paragraph, as not enabling. *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). See also MPEP § 2164.08(c). Such essential matter may include missing elements, steps or necessary structural cooperative relationships of elements described by the applicant(s) as necessary to practice the invention." (Underlining emphasis added.)

35 U.S.C. § 112, 2<sup>nd</sup> paragraph states: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." (Underlining emphasis added.)

It is clear from the sections of the MPEP and 35 U.S.C. discussed above that essential subject matter is that subject matter which Applicants disclose or describe as essential, not subject matter deemed by the Examiner to be essential. As Applicants have not disclosed or described any subject matter as essential, the rejection is improper and must be withdrawn.

It is also respectfully submitted that it is clear that the claims define what Applicants, not the Examiner, regard as their invention. Claim 7, as originally filed and as currently pending, clearly recites a substrate carrying system inserts a substrate from an airtight space in the substrate carrying system into a reaction chamber and the substrate is ejected from the reaction chamber to the airtight space. Accordingly, it is respectfully submitted that it is clear what subject matter Applicants regard as their invention.

Reconsideration and withdrawal of the rejection of claim 7 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph are respectfully requested.

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Claims 7-10 were rejected under 35 U.S.C. § 103(a) over McAndrew et al. (U.S. Patent 6,154,284) in view of Ishihara et al. (U.S. Patent 5,953,591). The rejection is respectfully traversed.

Claim 7 recites a semiconductor manufacturing method which performs reactive gas processing, wherein, when a substrate carrying system inserts a substrate from an airtight space in the substrate carrying system into a reaction chamber, and when the substrate is ejected from the reaction chamber to the airtight space, a reactive gas is fed into the reaction chamber and reacts therein. The method includes a substrate carrying step of measuring the moisture content in the airtight space by a first moisture measuring device connected to the airtight space and inserting the substrate from the airtight space in the substrate carrying system into the reaction chamber, or ejecting the substrate from the reaction chamber into the airtight space in the substrate carrying system. The method further includes a gas processing step of performing a reactive-gas-process while measuring the moisture content in the reaction chamber by a second moisture measuring device connected to the reaction chamber, after the substrate carrying step. In the substrate carrying step, after it has been confirmed that the moisture content in the airtight space is lower than a first default value, the substrate is inserted from the airtight space into the reaction chamber, and the substrate is ejected from the reaction chamber to the airtight space. In the gas processing step, the reactive-gas-process starts after it has been confirmed that the moisture content in the reaction chamber is lower than a second default value.

According to the method recited in claim 7, the moisture content in the airtight space in the substrate carrying system is measured and the moisture content in the reaction chamber is measured. Accordingly, it is possible to determine the effects of the moisture contents in the airtight space on the moisture content of the reaction chamber. In addition, according to the method of claim 7, after it has been confirmed that the moisture content in the airtight space is lower than a first default value, the substrate is inserted from the airtight space into the reaction chamber and in the gas processing step, the reactive-gas-process starts after it has been confirmed that the moisture content in the reaction chamber is lower than a second default value. It is therefore possible to reduce an increase in the moisture content which may be caused by gas inside the substrate carrying system seeping into the reaction chamber and achieve excellent epitaxial growth. See, for example, page 32, line 16 through page 33, line 11, of the instant specification.

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MPEP § 2143 states: "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."

The Examiner on page 4, lines 11-20, of the Office Action acknowledges that McAndrew et al. fail to disclose or suggest measuring the moisture content in the airtight space and thereafter inserting and ejecting the substrate by the substrate carrying system, as recited in claim 7 as originally filed, and the limitations of claim 8 as originally filed. The subject matter of claim 8 has been incorporated into claim 7 by the instant Amendment.

It is respectfully submitted that Ishihara et al. fails to cure the deficiencies of McAndrew et al. and that the combination fails to include all the limitations of claim 7, as amended to include the subject matter of claim 8, and thus fails to present a *prima facie* case of obviousness.

The Examiner alleges that column 4, lines 9-16; column 13, lines 25-37; column 14, lines 24-30; column 16, lines 13-19 and 44-49; and column 18, lines 26-34 and 39-44, of Ishihara et al. provide the limitations not disclosed by McAndrew et al. It is respectfully submitted that Ishihara et al. do not disclose or suggest the features of claim 7 acknowledged to be lacking in McAndrew et al., either in the passages cited by the Examiner or in the entirety of the disclosure.

Ishihara et al. disclose a gas tunnel 64 for transporting the substrate wafers 10. The tunnel 64 is communicated with a transport chamber 66 having a process chamber 67, 68, 69 and a cleaning chamber 70. The gas tunnel 64 has an inert gas entry device 72 which admits an inert gas, such as nitrogen, into the tunnel space 64 through a valve 71. The inert gas functions as a purge gas as well as a transport gas for moving the wafers 10. The gas tunnel has a window section 73 for a laser oscillator 74 and a laser detector 76 to detect a laser beam 79 through a window section 75. The oscillator 74 and the detector 76 are connected to a spectrometer controller 78 to compute the contamination level inside the tunnel 64 from the absorption spectral intensity measured. See column 15, lines 49-63. By measuring the absorption spectral intensity, the contamination due to moisture may be determined. Scattered beam detectors 88, 90 and reflectors 89, 91, respectively, are connected to the

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spectrometer controller 78 to compute the concentrations of solid contaminants from the scattered beam intensities.

Ishihara et al. further disclose in column 16, line 65 through column 17, line 35, that based on the moisture and solid particle contamination, the cleaning chamber 70 cleans the wafer surface based on the contamination data. See, in particular, column 17, lines 2-24. The contaminant data is also supplied to the inert gas entry device 72 so that if the level is high, the flow rate of the inert gas is increased to lower the concentration of contaminants in the tunnel 64. As further disclosed in column 17, lines 36-41, after lowering the contamination level in the tunnel 64 by the cleaning process appropriate to the level of contamination in the tunnel 64, the substrate wafers are supplied to the process chambers 67, 68, 69.

Ishihara et al. do not disclose or suggest a reactive gas processing step is performed after it is has been confirmed that a moisture content in a reaction chamber is lower than a second default value. As discussed above, Ishihara et al. determine the contamination level in the tunnel 64 and clean the wafers in the cleaning chamber 70 prior to supplying the wafers to the process chambers 67, 68 and 69. Ishihara et al. do not determine a moisture content, or any contamination level, in the process chambers 67, 68, 69.

As the combination of McAndrew et al. and Ishihara et al. fails to disclose or suggest all the limitations of claim 7, the combination fails to present a *prima facie* case of obviousness.

Claims 9, 10 and 16-18 recite additional features of the invention and are allowable for the same reasons discussed above with respect to claim 7 and for the additional features recited therein.

Claim 19 also recites measuring the moisture content in the inert gas in the process chamber. As discussed above, the combination of McAndrew et al. and Ishihara et al. fails to disclose or suggest this feature. Accordingly, claim 19 is allowable over the combination of McAndrew et al. and Ishihara et al.

Claim 20 recites additional features of the invention and is allowable for the same reasons discussed above with respect to claim 19 and for the additional features recited therein.

Reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) over McAndrew et al. in view of Ishihara et al. are respectfully requested.

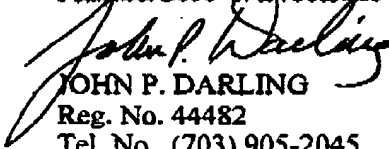
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In view of the above amendments and remarks, Applicants submit that all the claims are allowable and that the entire application is in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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